PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

APR 19 1933

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

APRIL 15, 1933

A Flower For Easter

See Page 233

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXIII *No. 627*

The Weekly Summary of Current Science

Published by

SCIENCE SERVICE

The Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by WATSON DAVIS

Subscription rates—$5.00 a year postpaid; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give old as well as new address.

Advertising rates furnished on application.

Board of Trustees of Science Service

Honorary President, William E. Ritter, University of California. Representing the American Association for the Advancement of Science, J. McKeen Cattell, *President*, Editor, Science, Garrison, N. Y.; Burton E. Livingston, Johns Hopkins University, Baltimore, Md.; Raymond Pearl, Director, Institute for Biological Research, Johns Hopkins University, Baltimore, Md. Representing the National Academy of Sciences, W. H. Howell, *Vice-President and Chairman of Executive Committee*, National Research Council, Washington, D. C.; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, Calif.; David White, Senior Geologist, U. S. Geological Survey. Representing National Research Council, Vernon Kellogg Secretary Emeritus, National Research Council, Washington, D. C.; C. G. Abbot, Secretary, Smithsonian Institution, Washington, D. C.; Harrison E. Howe, Editor of Industrial and Engineering Chemistry. Representing Journalistic Profession, John H. Finley, Associate Editor, New York Times; Mark Sullivan, Writer, Washington, D. C.; Marlen E. Pew, Editor of Editor and Publisher, New York City. Representing E. W. Scripps Estate, Harry L. Smithton, *Treasurer*, Cincinnati, Ohio; Robert P. Scripps, Scripps-Howard Newspapers, West Chester, Ohio; Thomas L. Sidlo, Cleveland, Ohio.

Staff of Science Service

Managing Editor, Watson Davis; Staff writers: Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, J. W. Young; Librarian, Minna Gill; Sales and Advertising Manager, Hallie Jenkins.

Copyright, 1933, by Science Service, Inc. Republication of any portion of the SCIENCE NEWS LETTER is strictly prohibited since it is distributed for personal, school, club or library use only. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service, details and samples of which will gladly be sent on request.

Members of the American Association for the Advancement of Science have the privilege of subscribing to the SCIENCE NEWS LETTER at the reduced price of $3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A. A. A. S., Smithsonian Institution Building, Washington, D. C.

Publication Office, 1930 Clifton Ave., Baltimore, Md., Editorial and Executive Office, Constitution Ave. at 21st St., N. W., Washington, D. C.

Address all communications to Washington, D. C. Cable address: Scienserve, Washington.

Entered as second class matter October 1, 1926, at the post-office at Baltimore Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. and Canadian Patent Offices.

DO YOU KNOW?

A rust-resisting tin plate is now on the market.

In three years, smoke in St. Louis was reduced fifty per cent.

At birth, the body of a human being is well stocked with iron but is poor in calcium.

Primitive natives in Australia believe that white men are ghosts of dead natives.

The building in which the Roman Senate met is being restored by Italian archaeologists.

In the earliest Babylonian calendar, the names of eight of the twelve months of the year refer to grain.

Swedish ski-jumpers may soon try aluminum skis which weigh less than half as much as hickory skis.

An Army doctor writes that as yet Filipinos have no racial immunity against tuberculosis, and deaths from this disease are increasing among them.

The world gets about 44,000 thunderstorms a day, on the average.

Food is perfectly safe if left standing in a can under proper conditions of storage after the can is opened.

If glass containing manganese is exposed long to the brilliant light of the desert, it turns amethyst pink.

Nearly 40 per cent. of the people in the United States owe their living to industries that did not exist 40 years ago.

The Chinese Emperor Yu, 2200 B.C., traveled far into the west of China and has been called the first Chinese explorer.

An infra-red room is being built in a race-horse stable in Ohio in the belief that horses need these rays as well as humans.

A powerful radio station nearing completion in Luxembourg will be devoted to international commercial advertising in different languages.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY
Where is the only known hexagonal "kiva?" p. 227.
Why is it thought that Stone Age men may have used wooden tools? p. 228.

ASTRONOMY-METEOROLOGY
How many variables does Dr. Abbot use to forecast solar radiation? p. 228.

BIOPHYSICS
What changes the sound of a tapped bone? p. 232.

BOTANY
Is the Easter Lily a proper Easter flower? p. 233.
What kind of leaves do bog and desert plants have? p. 233. *The Plant in Relation to Water—N. A. Maximov—Macmillan*, 1929, $6.50.

CHEMISTRY
What is the effect of agar-agar on bread? p. 237.

ECOLOGY
How do birds know when to migrate? p. 239.

ENDOCRINOLOGY
What is cortin? p. 227.

ENGINEERING
What kind of mattress is put on a river bed? p. 236.

ENGINEERING-GENERAL SCIENCE
What is the overall efficiency of the automobile? p. 234.

ENTOMOLOGY-PSYCHOLOGY
Where are a katydid's ears? p. 232.

EXPLORATION
To what height have climbers ascended Mt. Everest? p. 230. *The Story of Everest—John Noel—Little, Brown*, 1927, $4.

GENETICS
Are you likely to have cancer because one of your ancestors had it? p. 228.

MEDICINE
What is hexuronic acid thought to be? p. 229.
Why should physicians use dilaudid sparingly? p. 232.

METEOROLOGY—ARCHAEOLOGY
How did Inca farmers fight frost? p. 236.

PHARMACOLOGY
Why cannot methylene blue win the fight against large concentrations of cyanide? p. 234.

PHYSIOLOGY
How may premature aging of women be prevented? p. 232. *Sex and Internal Secretions—Ed. by Edgar Allen—Williams & Wilkins*, 1933, $10.
Which sex of rats stands illuminating gas better? p. 238.

PSYCHOLOGY
Does indiscriminate punishment hasten learning? p. 233.

PUBLIC HEALTH
How may electric refrigerators have reduced smallpox? p. 236.

VITAL STATISTICS
What proportion of those who die in automobile accidents are children? p. 227.

ZOOLOGY
What is the aardvark? p. 229.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in U. S.

ENDOCRINOLOGY

New Functions Discovered For Secretions of Adrenal Glands

Extract That Saves Addison's Disease Victims May Also Be Necessary in Vitamin Utilization and Milk Production

IMPORTANT new functions of the vital adrenal glands, concerned with vitamin utilization and milk production, were reported by Drs. Frank A. Hartman, J. E. Lockwood and K. A. Brownell of the University of Buffalo to the Federation of American Societies for Experimental Biology.

Members of the Federation have previously heard the Buffalo investigators describe the life-saving cortin which they extracted from the cortex of these two small glands that lie just above the kidneys. Cortin has saved the lives of sufferers from Addison's disease, an ailment in which the adrenal glands are diseased and fail to produce enough cortin themselves for the body's needs. Animals deprived of their adrenal glands quickly die, but their lives may be prolonged indefinitely by administration of cortin.

This week the Buffalo investigators reported experiments suggesting that adrenal cortical extract, possibly cortin itself, helps the body to utilize vitamins C and B_1. Likewise they have separated from cortical extract a substance that is necessary for the production of milk. They call this new hormone cortilactin.

The discovery of the relation of cortin to vitamin utilization came about when microscopic changes were found in adrenal gland cortex of animals getting too little of certain vitamins in their diets. This suggested that extra demands were being made of the glands to make up for the vitamin deficiency.

When an extract containing cortin was given to guinea pigs on vitamin C deficient diets, the onset of scurvy was delayed, the Buffalo investigators reported. The extract was prepared in such a way that none of the vitamin, which itself prevents scurvy, could have been present. Injection of this extract also delayed the onset of nerve symptoms due to deficiency of vitamin B_1 in the diet.

Apparently this function of the adrenal gland cortex is so important that provision is made for one gland to produce more of the substance concerned in vitamin utilization in case of injury to the other gland. This extra production on the part of the remaining, healthy gland is continued for about five weeks after disease or injury has put the other out of action.

Discussing the milk-producing hormone, cortilactin, Dr. Hartman and associates explained that cortin alone does not have this action. Mother rats that have no adrenal glands cannot raise litters of young, even with enough cortin to keep the mothers themselves healthy and fat. Cortilactin must be added.

Science News Letter, April 15, 1933

ARCHAEOLOGY

Unusual Features in Ruins At Yellowjacket Canyon

AN INDIAN ruin in Yellowjacket Canyon, Colorado, which was sighted by the Spanish friar Escalante when he traveled toward Utah in 1776, has at last been excavated.

For two years, Victor F. Lotrich, a teacher, aided by C. A. Thomas, has been unearthing rooms and relics of this long-burned settlement.

The ruins reveal a number of features unusual in the ancient Southwest, Mr. Lotrich has found. Cliff dwellings and pueblos commonly included several kivas or ceremonial chambers among the living quarters. In this little settlement on the canyon rim there were 12 ceremonial chambers, while only 11 dwelling rooms have been found. One of the kivas is not round or oval as the Indian "churches" usually were, but has hexagonal walls. No other hexagonal kiva has ever been found.

"In the floor of this kiva, beneath the ventilator shaft," said Mr. Lotrich, "was a sealed room containing a burial, but prairie dogs had made nests there and destroyed all specimens, only fragments of unrelated pottery remaining."

Mr. Lotrich has named the site "Square Mug Ruin" after the most remarkable object in it. This is a square mug about two and one-half inches tall, decorated handsomely with a bat-wing design in a double triangle. Indian pottery was rounded, almost always. Among the thousands of bowls and other containers found in the Southwest, only two or three square pieces have ever been discovered, Mr. Lotrich said.

RARITY

Among the thousands of bowls and similar pieces of pottery found in the Southwest, there are only two or three square pieces. This mug is the latest square container discovered.

Thirty bowls and several large corrugated pots, water jars, dippers and cylindrical mugs have also been found in the ruin. These are pronounced typical of the Mesa Verde type of Indian culture in Colorado.

Remains of several of the old inhabitants have been unearthed. They had heads flattened at the back by binding against a hard cradle-board, in a fashion prevalent in the Southwest long ago. One of the skeletons had upon its right wrist a beautiful string of 52 turquoise beads.

Science News Letter, April 15, 1933

VITAL STATISTICS

Fewer Children Killed By Automobiles

FEWER CHILDREN are being killed by automobiles now than any time in the last ten years, statistics of the Metropolitan Life Insurance Company show. The decrease in the number of child automobile deaths began in 1930.

"The year 1932 was the third successive year in which there had been a sizable drop in the death-rate of children from this cause," the company's statisticians report. (*Turn Page*)

They attribute this gratifying reduction in automobile accident deaths of children to the safety campaigns that have been waged by schools, police departments, insurance companies and women's organizations.

Until recently nearly one-fourth of all those killed by automobiles were children. Now less than one-fifth of automobile fatalities are those of children. Along with the marked reduction in the number of child victims, there has been a decline in the total number of automobile deaths during 1932. But the reduction in the child death-rate from this cause was marked in 1930 and 1931 in spite of the large increase in the number of cars on the roads in those years.

Science News Letter, April 15, 1933

ARCHAEOLOGY

Stone Age Men Used Wooden Tools

THE OLD STONE AGE may not have been so "stony" as it is often pictured. A French prehistorian has discovered that crude stone weapons of one of the early European cultures were probably turned out by blows of wooden instruments.

Reporting the latest views of French archaeologists on the Old Stone Age, before the central section of the American Anthropological Association at Chicago, Robert F. Greenlee said that the French prehistorian Coutier has demonstrated that a wooden instrument may effectively flake flint. In the Acheulian culture, which flourished in Europe over 100,000 years ago, hunters and fighters used improved weapons, compared to the still earlier Chellean men. The French archaeologist believes that these finer, flatter, and longer implements were the result of learning to shape stone with wood.

Mr. Greenlee, who recently assisted the noted French archaeologist, Abbé Breuil, in the task of reproducing Stone Age art on cavern walls, described a new chronology of the Old Stone Age.

Stone tools are about the only "standard" relics left of early periods of Old Stone Age life. These have been sorted into type cultures and named. By studying the tools in relation to geology, the Abbé Breuil has proposed some revisions in the present line-up of early Old Stone Age cultures.

Science News Letter, April 15, 1933

ASTRONOMY-METEOROLOGY

Less Radiation From Sun Forecast For Next Two Years

SUN'S weather forecast: Colder for the next two years.

The long-range forecast of the variations of the sun's radiation, announced by Dr. C. G. Abbot, secretary of the Smithsonian Institution, is "solar radiation generally below normal."

This is not a forecast of earthly weather. Dr. Abbot emphatically stated that weather is much more complex than variation of solar radiation "owing to circumstances of mountains, deserts, vegetation, oceans, ocean currents, snow, clouds, humidity, wind, which affect localities differently."

"Yet I am firmly persuaded that the main part of the departures from normal monthly mean temperatures at many localities" he writes in a bulletin of supporting data, "are produced by the seven periodic variations of the sun."

These are intricately woven periodicities of 7, 8, 11, 21, 25, 45, and 68 month periods which he has discovered as the result of observations and calculations extended over many years.

In making his two-year prediction Dr. Abbot combined the expected curves of each of these periods into one general curve. Two years ago he made a similar prediction with less accurate data, which in general has been fulfilled. The sun, as he predicted, has given off considerably more heat than normal.

Dr. Abbot and his colleagues are working on the problem of applying the solar radiation results to the prediction of temperatures at various inland points in this country.

Science News Letter, April 15, 1933

GENETICS

Liability To Cancer Not Inherited, Rat Study Shows

LIABILITY to cancer as such is not inherited, results of a twelve-year investigation with rats has shown. The studies were made by Drs. M. R. Curtis, W. F. Dunning and F. D. Bullock of Columbia University and are reported in the *American Journal of Cancer*.

The investigations are said to answer the question whether you are more likely to have cancer because one of your ancestors had it.

Chance is an important factor, the Columbia investigators said. Liability to cancer is not carried in the germ cells that carry hereditary traits, such as hair and eye color, it appears from their studies. The only way in which heredity can affect the development of cancer is insofar as it determines whether or not you will have a long life, and whether you will or will not be susceptible to a given irritant. This is because, in the opinion of the Columbia investigators, length of life and irritation are the only two factors responsible for development of cancer.

Dr. Francis Carter Wood, director of Columbia University's Institute of Cancer Research where the work was done, described the experiments and their significance as follows:

"For twelve years these investigators have been breeding white and colored rats and infesting them with a parasitic worm which causes cancer of the liver. Over 26,000 have been so treated and the total number of animals studied is more than 52,000. Of the 26,000 only 3,300 developed cancer.

"The studies of the condition underlying the appearance of this cancer have shown that the only factors in the appearance of the cancer have been the length of the life of the animal and the amount of irritation produced by the worm. If only a few worms grow in the liver, the animal may live a long time without having cancer, but the more worms that develop, the more

likely are the animals to have cancer, so that they conclude that if a sufficient number of parasites is present and the animal lives long enough, every rat would develop cancer.

"Thus the idea hitherto prevalent that the liability to cancer is carried in the germ cells is not borne out by these experiments. The cancer change is in a body cell and due to some sort of irritant. The technical term is somatic mutation. No matter how inbred these animals were, no cancer of the liver occurred unless the animals were irritated by these parasites.

"This is an extremely hopeful discovery for it means that while long life is one factor in having cancer, as was shown long ago from the life insurance records, the only other is the amount of irritation, so that if irritation can be avoided a person is not likely to develop the disease."

Science News Letter, April 15, 1933

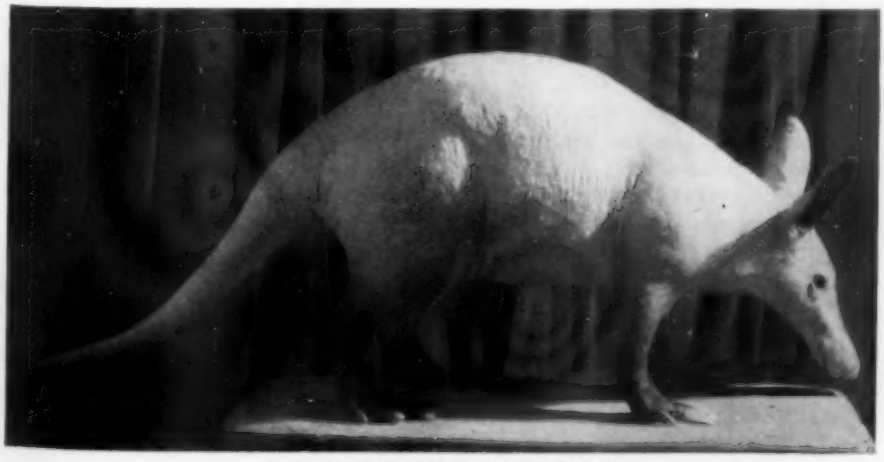
ZOOLOGY

Aardvark Comes To Buffalo Museum

LOOKING LIKE some strange imaginary monster out of a medieval bestiary, as weird to the eye as his Boer-Dutch name is to the ear, the aardvark is enough of a rarity in this country to justify special mention when a new specimen arrives.

The animal pictured here has been added to the collections of the Buffalo Museum of Science. Timid and seclusive by day, the aardvark prowls at night, ripping open ant-heaps with his powerful claws and licking up the enraged swarming insects with a long sticky tongue that flickers through his tubular snout.

Science News Letter, April 15, 1933



THE INCREDIBLE AARDVARK

MEDICINE

Research Indicates Vitamin C May Contain Cure For Goiter

Iodine Ally Seen as Result of Tests With Rabbits Given Goiter by Cabbage Diet and Cured by Cabbage Extract

A FURTHER means of controlling the still baffling disease, goiter, may be found in vitamin C, it appears from the latest work of a pioneer in goiter research, Dr. David Marine of the Montefiore Hospital in New York.

Working with Drs. E. J. Baumann, B. Webster and A. Cipra, Dr. Marine produced goiters in rabbits by feeding them cabbage. Then he cured the rabbits by giving them an extract made from cabbage. The extract was made by the same method Szent-Györgyi used in preparing hexuronic acid from certain plant tissues and from adrenal gland cortex. It is thought to be vitamin C, just as hexuronic acid itself is now believed to be vitamin C.

Iodine Not Responsible

The cabbage extract is practically free from iodine, which has long been known to reduce the size of simple goiters. So the potency of the cabbage extract in curing the rabbit goiters is believed not to be due to its iodine content.

The work began with the observation of Drs. Alan Chesney and Webster that rabbits fed on an exclusive cabbage diet developed goiter. Drs. Marine and Bauman subsequently noted that steaming the cabbage developed the goiter even more rapidly. The juice pressed from the steamed cabbage plays no part in producing the goiters, but only the press cake remaining. Washing the cabbage increases its goiter-producing properties, although the amount of iodine removed in washing was believed too small to be active in preventing the goiters.

Odd Cures

Strangely enough, these goiters are cured by lawn grass, fresh alfalfa and even skunk cabbage. The curative power of these materials is found to vary not with their iodine-containing property as hitherto believed, but with their iodine-absorbing power. It is greatest in young growing plants and least in those that have been stored, dried or exposed to air for a time.

These observations led to the belief that hexuronic acid or some substance closely paralleling it found in plant tissues might be the active agent in preventing the goiters. Then followed the demonstration that an extract from cabbage, prepared as for hexuronic acid, does actually reduce the size of the goiters.

In explaining why certain foods may produce goiters and certain plant and animal tissues cure them, Dr. Marine said that the foods that produce goiters contain certain chemicals which prevent the burning of food in the body. This increases the need for thyroid secretion and produces a relative deficiency of iodine. The plant and animal tissues which cure goiter contain substances which absorb iodine and thus spare the thyroid gland from overactivity, perhaps by lessening the need for its iodine-containing secretion. Hexuronic acid, found in both plant and animal tissues and believed to be vitamin C, is such a compound.

Science News Letter, April 15, 1933

Engineers report that tractors scarcely bigger than baby carriages and powered with tiny motors can be built for economical operation on small farms of less than twenty acres.

EXPLORATION

Another Try at Everest

Conquest of the World's Highest Mountain by Airplane Spurs on Climbers Mobilizing for a New Attack

By EMILY C. DAVIS

BRITISH FLYERS have conquered Mount Everest from the air. The hazardous feat of flying over the maze of Himalayan peaks and spurs and, identifying Everest, circling triumphantly over the summit, has been achieved.

It now remains for the British land expedition to carry through its even more hazardous task of climbing the world's highest mountain and standing in triumph on the topmost point of the peak, five and one half miles aloft!

Despite the most carefully laid plans to reach that summit, no human being has ever boasted of standing on the very ridgepole of the roof of the world. Tibetans in the highlands about the great mountain have always smiled wisely at these futile efforts of the foreigner. In their eyes, Everest is holy and more powerful than the foreigners who try to match wits with the spirits of the mountain. The Tibetans call Everest the Mother Goddess of the Mountain Snows.

These Tibetan natives have seen what befell three Everest expeditions. One man was stricken by illness and death before he even reached the real ascent, in 1921. Seven men were swept into eternity by an avalanche in 1922. Two men mysteriously vanished in 1924.

Among the highland people, the record of fatalities breeds a superstitious legend of divine vengeance, like the legend of a curse against those who tamper with Egypt's royal tombs. Obviously, the natives point out, the spirits of the mountain have spoken in displeasure. The foreigners should have learned their lesson.

But the foreigners are not daunted. The very first expedition to attempt flight over Everest has succeeded. They believe that the mountain can be climbed. So the British are mobilizing now for their new attack up the slopes of Everest.

Like the Tibetans, the explorers feel that the mountain is truly terrible and awe-inspiring. But invisible demons seeking vengeance are the least of the explorers' worries. Three campaigns to Everest in the past 11 years have shown clearly that the demons of the mountain are these:

1. Altitude, such as mountain climbers have never experienced.
2. Weather so hostile to human bodies that it is no wonder the natives think malignant spirits are responsible.
3. Avalanches, which may hurl an expedition into eternity in a minute.
4. Baleful effects of ultraviolet rays at the high altitudes of the peak.

To fight these demons of Everest the explorers are marshaling all the forces of science. Every bit of experience from previous climbs is taken into account.

"50 to 1 Against"

After the 1921 expedition, one climber reckoned the chances of a given party reaching the top of Everest at a given time as "50 to 1 against." Today there is a strong feeling of confidence.

The new British climb is under the same auspices as three previous expeditions—the Mount Everest Committee, with headquarters at the Royal Geographical Society's House in London. The leader is Hugh Ruttledge, former deputy commissioner in the Indian Service, and well-known for his explorations in the Himalayas.

Conquering Mount Everest is a passion which British explorers have taken to their hearts. There is valuable scientific information to be gathered in this remote skyland of Asia, of course.

Former expeditions have observed geological formations and described the wild life of the mountain. Snakes were unexpected inhabitants seen at hot springs in one of the high passes, and spiders were found in crevices of ice 22,000 feet high. Odell, a geologist, found fossils at a height of 25,000 feet.

The medical officer of the last expedition took records of blood pressure, pulse rate, knee jerk and other physiological data on the climbers at heights up to 21,000 feet. He even set his fellow climbers to doing mental tests, and found that they could multiply and divide sums with "no definite deterioration of mental activity."

He added, humorously, "It will not please the members of the next expedition to hear that more complicated and worrying tests are required."

But valuable as the scientific data from Everest may be, the attempt on Everest is, to British explorers, primarily a great adventure, one of the last great adventures left in the world. Explorers are coming to the gloomy view of Alexander the Great, who could see no more worlds to conquer. Little wonder that the British are determined to make the conquest of Mount Everest a British achievement.

This viewpoint is clearly expressed by Lord Clydesdale. In announcing his plans to act as pilot for the flight over Everest, he said:

"The objects of the expedition are first and foremost to promote British prestige in the world, and especially in India. Americans have flown over the North Pole and the South Pole, the Pacific Ocean has been crossed by air, and the Atlantic has been frequently flown in recent years.

"There is only one original flight worth while; that is the flight over Mount Everest, which stands out as the only significant part of the world which has not been flown over."

He added that flying over this mountain would have a great psychological effect on India, dispelling the fallacy

FAMED PEAKS

***Everest** (Himalayas)	29,141
Kanchenjunga (Himalayas)	28,225
***Aconcagua** (Chile - Argentina)	22,834
***McKinley** (Alaska)	20,300
***Kilimanjaro** (Africa)	19,710
***Elbrus** (Europe)	18,465
Popocatepetl (Mexico)	17,543
Mont Blanc (Pennine Alps)	15,781
Whitney (United States)	14,496
Fujiyama (Japan)	12,395

**Highest on their continents.*

that England is weakening, and that the British are no longer a virile and active race. Such a feat would strongly emphasize British daring and hardihood.

Although three previous climbing expeditions have been sent out by the Mount Everest Committee, only two can be said to have failed in reaching their lofty goal.

Surveyed in 1921

The first expedition set out in 1921 to survey the scene and lay the campaign for climbing the peak. This was done successfully. The explorers advanced northward from Darjeeling, India, into Tibet. They journeyed through unknown valleys and plains up to the glaciers of Everest.

From the northeast side of the mountain, where the ice cliffs seemed least formidable, they pushed their way closer to the peak they would some day climb. They stood on one of the ridges 23,000 feet high and were able to see how the climb should be made.

Before that reconnoitering trip, the nearest approach to Everest by a white man had been made by the explorer Capt. John Noel, who got within 40 miles of the mountain in 1913. Yet as far back as 1893 there were plans outlined for climbing Mount Everest.

The first dash for the top came in 1922, in a campaign planned with military thoroughness. Native porters carried supplies. The caravan moved up to one camp after another, resting at each upward stage for the men to become a little accustomed to the rarefied air.

Before that ascent, the altitude record for mountain climbing was held by the Duke of Abruzzi, who attained 24,600 feet on Bride Peak in the Himalayas. Now, on Everest, men slept in camp at 25,500 feet, without oxygen, demonstrating that human lungs and hearts can grow accustomed to such extreme, almost fantastic conditions for life.

At 27,300 feet, Bruce and Finch set a new record and could go no farther. Almost 2,000 more feet of climbing stretched ahead of them, but the season was late, and the men weary. On June 17, the mountain gave a terrible warning by sweeping seven native porters into eternity in an avalanche of snow.

The 1924 expedition saw some of the same men, even relatives of the dead porters, back on the slopes of Everest, more determined than ever. They established chains of camps as high as 27,000 feet, higher than native porters had ever carried loads.

Roerich Museum

MT EVEREST LURES

Two explorers, Mallory and Irvine, made an attempt to reach the summit. Other members of the party, watching from a lower station, saw the two climbers pass out of sight in the mist. At 600 feet from the top, their forms came into sight for an instant, then they were never seen again.

From these experiences, British explorers feel that they know the worst that this mountain can do, and they believe that they can go over the top to victory.

The fascination which this unfriendly but very beautiful mountain holds for mountain explorers is not easy for groundlings to appreciate, as they hear of the ordeals endured.

Hearts Pound in Thin Air

At such altitudes as 16,000 feet, or even 19,000, natives live comfortably in high plateaus of the world. But for a man to try to rise to 29,000 feet within a few weeks is something entirely different. The machinery of heart and lungs is thrown violently out of adjustment by a sudden rise into thinner air.

Climbers back from Everest expeditions tell vividly of their feelings on the climb. Their hearts pound mercilessly. The thin air parches their throats. Their lungs feel stifled for want of oxygen. A dragging stupidity overwhelms them, so that any exertion seems too much. Yet they must still try to take pictures, or aid in camp work, or push their dragging bodies forward to a higher, more perilous station.

Captain Noel, photographic historian of the 1922 and 1924 expeditions, tells in his book, "The Story of Everest," about his struggle to get four cameras, tripods, supplies, developing tent, and tanks up the most difficult mountain trails in the world and up to the glacial heights of the highest mountain.

With the help of his porters, he got the cameras up to 23,000 feet. And he adds with the matter-of-fact simplicity that characterizes those who set records on Everest: "That is the altitude record for any motion picture machine."

Needless to say, Everest is approached only at the most favorable time of year. A winter climb would be unthinkable. Summer brings the warm monsoon winds, and avalanches of snow come crashing down the mountainsides. It is only for a few weeks spring and fall that the weather tantalizingly lures men to come up to Everest and offers them a sportsman's gamble with success.

Even in that brief, favorable interlude, temperatures below zero are the rule on the mountain. Far worse than cold is the wind, which cuts like knife blades and never ceases tearing around the mountain. Each expedition has its casualties of frostbitten ears, fingers, and other parts of the body. The infra-red rays of sunlight striking the snow cause snow blindness in any climbers who fail to keep their eyes protected by glasses. And at the same time the ultra-violet rays of sunlight are so strong that there is danger of burning if the face is not protected.

This article was edited from manuscript prepared by Science Service for use in illustrated newspaper magazines. Copyright, 1933, by EveryWeek Magazine and Science Service.

BIOPHYSICS

Each Bone Has Own Sound When Tapped, Russian Finds

EVERY BONE has its own distinct sound when it is tapped, Dr. T. J. Ariev of Leningrad has found. He has proved this by oscillograms taken of several important large parts of the human skeleton. The oscillograms are written records of the sound waves set in motion by the bone when tapped. These written records make possible a much more accurate comparison of the varying sounds of tapped bones than could be obtained merely by listening to them.

The sound of the bones is naturally affected by age, sex, race and individual peculiarities of body build. Whenever there is an inflammation of the bone or it is cracked or broken, the sound undergoes a marked change. This may be readily brought out by comparing the tones of healthy and suspected bones, as practically every bone of the human body has its counterpart, it is claimed.

Dr. Ariev's observation was pronounced a valuable medical advance by a special committee of health authorities and physicists which was set up to examine his method and results. According to Prof. A. F. Joffe of the Russian Academy of Science, who was on this examination committee, it is quite feasible to construct a simple acoustical apparatus for investigation of bones which would produce records of sounds, just as an X-ray machine makes X-ray pictures.

Science News Letter, April 15, 1933

ENTOMOLOGY-PSYCHOLOGY

Scientists Listen In On Katydid's Hearing Apparatus

A KATYDID'S KNEES, which are that creature's own peculiar "ears," have given men the novel experience of listening in on the insect's world of sound.

The story of how scientists have tapped the hearing circuit of katydids and crickets by placing electrodes against the knees of the insects, amplifying the responses picked up, and listening in on these in an ordinary telephone receiver, was related to the meeting of the New York Branch, American Psychological Association, by Drs. E. G. Wever and C. W. Bray, of Princeton University.

The resulting sound was always a sort of "shushing" noise, regardless of the source of the sound. Human speech lost all characteristic qualities except the rhythm, which was preserved.

But the katydid is apparently deaf to the ordinary sounds of our world and hears principally those that are beyond the reach of human ears. Sounds of frequency below 800 cycles produced no response even when very loud. But the higher frequencies, even up to 45,000 cycles per second, were picked up. The limit of man's hearing is usually about 20,000 cycles—the shrillest note of the peanut whistle.

Results for the cricket were similar, except that his hearing range is apparently between 500 cycles and 11,000 cycles, considerably lower than that of the katydid and with an upper limit considerably below that of man.

Science News Letter, April 15, 1933

MEDICINE

Doctors Warned About Use Of New Pain-Relieving Drug

DILAUDID, new pain-relieving drug which has been hailed as a substitute for morphine, should be used cautiously until it has been studied further, doctors are warned.

The warning appeared in a report by Dr. Nathan B. Eddy of the University of Michigan to the American Medical Association. The report was published in the Association's Journal at Chicago. Dr. Eddy has been engaged in studies of narcotic drugs in an investigation sponsored by the National Research Council.

Dilaudid is known chemically as dihydromorphinone hydrochloride. It is closely related to morphine, and was developed in German research laboratories. It has been described as more potent in relieving pain than morphine, and less objectionable in other ways. Notably, it has been said to be less likely to lead to habit-formation than morphine.

In a review of the subject, Dr. Eddy found that cases of addiction to dilaudid have been reported. Experimental studies of the drug have not yet established whether or not it is habit-forming. Investigation of this point is now being made by Dr. Eddy and associates.

Meanwhile, he suggests that physicians should avoid prolonged use of the drug until more is known about its pharmacologic properties.

Science News Letter, April 15, 1933

IN SCIE

ENDOCRINOLOGY

Anti-Growth Factor Found In Parathyroid Glands

DEFINITE EVIDENCE of an anti-growth factor in the parathyroid gland has recently been found by Drs. C. J. Eastland, N. Evers and J. H. Thompson, working at Kings College, London, and the Royal College of Surgeons, England.

These investigators treated fresh parathyroid gland in a special way and obtained an extract which had a harmful effect on the growth of rats, they reported to the *Biochemical Journal*. Six rats were used as controls, and six were given daily injections of a small measured amount of the extract, other conditions being the same for both groups of rats.

The factor which retarded the growth was destroyed by treatment with hydrogen peroxide.

Science News Letter, April 15, 1933

PHYSIOLOGY

Hormone Treatment Halts Premature Aging of Women

SLIGHTLY reminiscent of the Steinach rejuvenation operation and the fiction of Gertrude Atherton's much-discussed novel, *Black Oxen*, is a treatment for premature aging in women which two St. Louis physicians are now studying. The treatment makes use of one of the very modern medical agents, a hormone called theelin.

Symptoms of premature old age in five women, following surgical removal of certain organs which had become diseased, were relieved by treatment with theelin, Drs. August A. Werner and W. D. Collier reported to the American Medical Association. In most respects the patients had the feelings and bodily functions of normal women.

These cases seem to bear out the theories regarding the function and possible clinical use of theelin held by the original discoverers and investigators of this potent hormone.

Science News Letter, April 15, 1933

EE FIELDS

BOTANY

Nitrogen Lack Makes Bog and Desert Plants Alike

WHY PLANTS growing in bogs, where there is always plenty of water, should have thick, tough, leathery leaves protected against evaporation, resembling desert plants in this respect, has long been a puzzle to botanists. A German botanist, Dr. Kurt Mothes of the University of Halle a. Saale, believes he has found a possible key in the lack of nitrogen in bog water and soil, rather than anything to do with the water relationship itself.

He was struck by the fact that of all bog plants the sundews, which capture insects with the sticky fingers on their leaves and thereby get plenty of nitrogen, are the least desert-like in their appearance and structure. The same might be said of two groups of American insectivorous plants, the Venus flytrap and the pitcher plants.

To test the possibilities of his hypothesis, Dr. Mothes grew tobacco plants, which normally are anything but desert-like, in culture solutions containing plenty of other mineral nutrients but lacking in nitrogen. They responded by developing thick, tough, leathery leaves, with small stomata or "breathing pores" and other characteristic structures of desert plants.

The full technical discussion of Dr. Mothes' experiments is published in the *Biologisches Zentralblatt.*

Science News Letter, April 15, 1933

BOTANY

Narcissi Merit Recognition As Proper Easter Flowers

See Front Cover

EASTER has always been a festival of flowers. Indeed, one of the reasons why the early missionary Church found it comparatively easy to get its converts to adopt this holy day was because most of them already had a holiday at the same season—a celebration of the returning sun, when they garnished houses and temples with fresh flowers.

There is, however, a curious inappropriateness in the almost universal use nowadays of the long-throated lily species that has by common consent come to be known as the "Easter lily." In the first place, Easter is not its natural time of blooming; it has to be forced to get it into flower at this time of year. Moreover, it is not native to the lands of the Easter tradition, but comes from Japan; it was quite unknown to Western horticulture until after the commercial opening of that still pagan land.

Much more appropriate, it would seem, would be the recognition of the narcissi to a leading place in the Easter floral display. The various species of narcissus flower early, even in our northern lands, and many of them are ready for Easter without forcing. The best-known of them, like the paper-whites and the poet's narcissus, are native to the Mediterranean lands, the fountain-head and early home of the Christian tradition.

The photograph of the paper-white narcissus on the cover is the work of Cornelia Clarke.

Science News Letter, April 15, 1933

ASTRONOMY

Jupiter To Hide Star In Rare Occultation

A VERY RARE form of eclipse, the hiding of a star by the planet Jupiter, will occur early Friday morning, April 21, Dr. L. J. Comrie, superintendent of H. M. Nautical Almanac Office in London, has announced. Dr. Comrie stated that the prediction has been made by Arthur Burnet, and that the disappearance of the star will be visible over the entire North American Continent. Because it will be invisible in Europe, he has requested that American Astronomers make all possible observations of it.

The star, which is only known by its catalog number, B.D. plus 8 degrees 2456, is of the ninth magnitude, well below the limit of naked-eye visibility. However, it can be seen in moderate sized telescopes. At Cambridge, Mass., said Dr. Comrie, the disappearance of the star will take place at 1:38 a. m., eastern standard time. At the Lick Observatory, Mt. Hamilton, Calif., it will occur at 1:43 a. m. Dr. Comrie said that on account of the very slow motion of Jupiter through the sky, the times predicted are subject to an uncertainty of a few minutes.

Science News Letter, April 15, 1933

PSYCHOLOGY

Indiscriminate Punishment Aids Learning of Rats

PARENTS and teachers agree that giving Johnny a candy or other reward every time he gets the right answer will hasten his learning. And many think that punishment, whether by spanking, scolding, or in other ways, whenever he gives the wrong answer is also effective. But what happens when both reward and punishment are served out indiscriminately for both types of action?

A partial answer to this question may be deduced from the report of S. Diamond, of New York University, at the meeting of the New York Branch, American Psychological Association.

Rats were placed in a box similar to that used by psychologists for testing the ability of animals to learn which of two paths is the correct one to lead them to a reward of food. But in this case both paths led to the food. And whichever path the rats chose, they met with punishment in the form of a harmless but uncomfortable electric shock.

These punished rats tended to select one or the other of the paths and form the habit of going in that direction much more quickly than did rats who were not punished.

Indiscriminate punishment hastens learning, is Mr. Diamond's conclusion. But, of course, it does not guide it.

Science News Letter, April 15, 1933

PLANT PATHOLOGY

Hop Crop Menaced; New Kinds Sought

HOP GROWERS of Oregon, Washington and California, promised their first real prosperity since the Volstead blight struck their industry, have suddenly had to face another and even more serious foe in the fungus disease known as downy mildew. The mildew seems to have come in through British Columbia, and has assumed the proportions of a major plague within the past three years.

A search is being made for resistant plants of native and foreign stocks, from which hybrid strains can be bred that will defy the disease while they mature their crop. In the meantime, fungicide sprays are being used for the salvation of existing crops of non-resistant hop strains.

Science News Letter, April 15, 1933

PHARMACOLOGY

Fight For Life Between Blue Dye and Cyanide Described

THE WARFARE and strategy that goes on in the human body when the blue dye, methylene blue, is called in to fight poisonous cyanides was revealed in a report by Dr. William B. Wendel of Washington University School of Medicine to the Federation of Societies for Experimental Biology.

Dr. Wendel's study showed that methylene blue can only win the fight for life against the poison when the dose of cyanide is not great. Successful use of the dye as antidote in a case of cyanide poisoning was reported last fall by Dr. J. C. Geiger, San Francisco Director of Public Health. The antagonistic action of the dye for cyanides has been observed by a number of scientists. Mrs. Matilda M. Brooks of the University of California claims to have first suggested its use as an antidote in poisoning and suicide cases.

Cyanides cause death by suffocation, since they interfere with the supply of oxygen to the tissues. Methylene blue fights cyanides by converting some of the oxygen-carrying hemoglobin of the blood into a new chemical compound, methemoglobin. This new compound is able to force the cyanide out of combat by uniting with it to form the chemical union, cyan-methemoglobin, which is harmless itself, and which keeps the cyanide from interfering with the vital, oxygen-carrying activity of the rest of the blood hemoglobin.

The only difficulty is that when very much of the poisonous cyanide has gotten into the body, too much hemoglobin is mobilized by methylene blue for the fight against the enemy, and not enough is left to carry on the important job of feeding oxygen to the tissues. So that even if all the poison of a large dose were forced into chemical union with methemoglobin, the fight would nevertheless be lost and death result from lack of oxygen, or asphyxia.

Dr. Wendel found that it would take nearly two-thirds of all the hemoglobin in the body to overcome four deadly doses of the poison. In Dr. Geiger's case, probably from one-fourth to one-third of the total amount of hemoglobin was withdrawn from its normal job of oxygen-carrying in order to overcome the poison. If Dr. Geiger's patient had absorbed two or three times as much of the deadly cyanide, however, he almost certainly would not have survived, in spite of the use of methylene blue because in such a case far too much hemoglobin would have been diverted from oxygen-carrying to combining with the dye and the poison.

Science News Letter, April 15, 1933

ENGINEERING—GENERAL SCIENCE

Unknown Almost Infinite, Measure of Progress Shows

EARLIER in the depression it was fashionable to blame all of our troubles on science and its machines. Moratoria on science were urged by several well-intentioned if misinformed persons.

Those who were figuratively panting in an attempt to keep up with science and engineering felt that our economic troubles were due to the fact that pure and applied science have advanced too fast. The non-scientific activities of mankind such as finance, government, business and philosophy had not been able to keep up with the procession of civilization lead by science.

The scientists, on the other hand, while admitting that science seems to have outstripped the other functions of our civilization, nevertheless point to the many frontiers upon which the advance of knowledge is pressing. Compared with what we know, what is unknown is nearly infinite.

This controversy puzzled a mechanical engineer, James Winston, and he determined to figure out whether applied science is so efficient as the non-scientific leaders take for granted. Since engineers have made some of their most remarkable advances in automobile development, Mr. Winston made an inquiry into how much or how little further they can progress in the development of automobile transportation before reaching perfection.

"The weight of a small five-passenger sedan is around 2500 pounds," he explained in a communication to *Mechanical Engineering*. "The weight of five average passengers will be about 800 pounds. Therefore in order to transport a useful load of 800 pounds a total load of 800 plus 2500, equal to 3300 pounds, must be transported. This represents an efficiency of 24 per cent. in the load ratio.

"The next step is to determine the efficiency of the engine. According to numerous tests the average automobile engine can convert only one-fifth of the energy in the gasoline into power. In the language of science this represents a thermal efficiency of 20 per cent.

"Similarly the mechanical efficiency of the engine is 80 per cent., and that of the transmission machinery, 80 per cent. This makes the overall efficiency of automobile transportation of passengers 3 per cent.

"We can see, therefore, that in one of his most successful lines of activity the engineer has attained an efficiency of only 3 per cent. In other words, he must advance 33 times as much as he has thus far in order to attain perfection.

"If this progress seems too fast for philosophers, financiers, business men, and others, it seems so only because their own advance has been very much less than 3 per cent."

Science News Letter, April 15, 1933

Nine out of ten injuries or deaths from lightning occur in the country and small town districts.

A pickle manufacturer in Australia peels onions by subjecting them to a fierce gas flame for three seconds as they roll down an incline, thus burning off the skins.

RADIO

THE GREAT IMPORTANCE OF "LITTLE THINGS" IN NUTRITION

by

Dr. Lafayette B. Mendel

Professor of Physiological Chemistry at Yale University

This address will be given Friday, April 21, at 12:45 P. M., over stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

ASTRONOMY

Star Velocities in the Line of Sight

"A Classic of Science"

Invisible Motions Are Measured in Terrestrial Units Since Huggins Used Doppler-Fizeau Principles in 1868

THE SCIENTIFIC PAPERS OF SIR WILLIAM HUGGINS, Edited by Sir William Huggins and Lady Huggins, London: William Wesley and Son, 1909. *HISTORICAL STATEMENT, From the Nineteenth Century Review, June* 1897. *This is an exact reprint of this publication.*

FROM THE BEGINNING of our work upon the spectra of the stars, I saw in vision the application of the new knowledge to the creation of a great method of astronomical observation which could not fail in future to have a powerful influence on the progress of astronomy; indeed, in some respects greater than the more direct one of the investigation of the chemical nature and the relative physical conditions of the stars.

It was the opprobrium of the older astronomy—though indeed one which involved no disgrace, for *à l'impossible nul n'est tenu*—that only that part of the motions of the stars which is across the line of sight could be seen and directly measured. The direct observation of the other component in the line of sight, since it caused no change of place and, from the great distance of the stars, no appreciable change in size or of brightness within an observer's lifetime, seemed to lie hopelessly quite outside the limits of man's powers. Still, it was only too clear that, so long as we were unable to ascertain directly those components of the stars' motions which lie in the line of sight, the speed and direction of the solar motion in space, and many of the great problems of the constitution of the heavens, must remain more or less imperfectly known.

Now as the colour of a given kind of light, and the exact position it would take up in a spectrum, depends directly upon the length of the waves, or, to put it differently, upon the number of waves which would pass into the eye in a second of time, it seemed more than probable that motion between the source of the light and the observer must change the apparent length of the waves to him, and the number reaching his eye in a second. To a swimmer striking out from the shore each wave is shorter, and the number he goes through in a given time is greater than would be the case if he had stood still in the water. Such a change of wave-length would transform any given kind of light, so that it would take a new place in the spectrum, and from the amount of this change to a higher or to a lower place, we could determine the velocity per second of the relative motion between the star and the earth.

The notion that the propagation of light is not instantaneous, though rapid far beyond the appreciation of our senses, is due, not as is sometimes stated to Francis, but to Roger Bacon. "Relinquitur ergo," he says, in his *Opus Majus,* "quod lux multiplicatur in tempore . . . sed tamen non in tempore sensibili et perceptibili a visu, sed insensibili. . . ."

The discovery of its actual velocity was made by Roemer in 1675, from observations of the satellites of Jupiter. Now, though the effect of motion in the line of sight upon the apparent velocity of light underlies Roemer's determinations, the idea of a change of colour in light from motion between the source of light and the observer was announced for the first time by Doppler in 1841. Later, various experiments were made in connection with this view by Ballot, Sestini, Klinkerfues, Clerk Maxwell, and Fizeau. But no attempts had been made, nor were indeed possible, to discover by this principle the motions of the heavenly bodies in the line of sight. For, to learn whether any change in the light had taken place from motion in the line of sight, it was clearly necessary to know the original wave-length of the light before it left the star.

SIR WILLIAM HUGGINS, 1824-1910

As soon as our observations had shown that certain earthly substances were present in the stars, the original wavelengths of their lines became known, and any small want to coincidence of the stellar lines with the same lines produced upon the earth might safely be interpreted as revealing the velocity of approach or of recession between the star and the earth.

These considerations were present to my mind from the first, and helped me to bear up under many toilsome disappointments: "Studio fallente laborem." It was not until 1866 that I found time to construct a spectroscope of greater power for this research. It would be scarcely possible, even with greater space, to convey to the reader any true conception of the difficulties which presented themselves in this work, from various instrumental causes, and of the extreme care and caution which were needful to distinguish spurious instrumental shifts of a line from a true shift due to the star's motion.

At last, in 1868, I felt able to an-

Sir William Huggins' application of the spectroscope to study of the Great Nebula in Orion, which showed that some nebulae are gaseous like the stars while others have a distinct type of spectrum which may show the presence of solid or liquid matter in the nucleus, appeared as the Classic of Science in the SCIENCE NEWS LETTER for June 20, 1931.

nounce, in a paper printed in the *Transactions of the Royal Society* for that year, the foundation of this new method of research, which, transcending the wildest dreams of an earlier time, enables the astronomer to measure off directly in terrestrial units the invisible motions in the line of sight of the heavenly bodies.

To pure astronomers the method came before its time, since they were then unfamiliar with Spectrum Analysis, which lay completely outside the routine work of an observatory. It would be easy to mention the names of men well known, to whom I was "as a very lovely song of one that hath a pleasant voice." They heard my words, but for a time were very slow to avail themselves of this new power of research. My observations were, however, shortly afterwards confirmed by Vogel in Germany; and by others the principle was soon applied to solar phenomena. By making use of improved methods of photography, Vogel has recently determined the motions of approach and of recession of some fifty stars, with an accuracy of about an English mile a second. In the hands of Young, Dunèr, Keeler, and others, the method has been successfully applied to a determination of the rotation of the sun, of Saturn and his rings, and of Jupiter.

It has become fruitful in another direction, for it puts into our hands the power of separating double stars which are beyond the resolving power of any telescopes that can ever be constructed. Pickering and Vogel have independently discovered by this method an entirely new class of double stars.

Double stars too close to be separately visible unite in giving a compound spectrum. Now, if the stars are in motion about a common centre of gravity, the lines of one star will shift periodically relatively to similar lines of the other star, in the spectrum common to both; and such lines will consequently, at those times, appear double. Even if one of the stars is too dark to give a spectrum which can be seen upon that of the other star, as is actually the case with Algol and Spica, the whirling of the stars about each other may be discovered from the periodical shifting of the lines of the brighter star relatively to terrestrial lines of the same substance. It is clear that as the stars revolve about their common centre of gravity, the bright star would be sometimes advancing, and at others receding, relatively to an observer on the earth, except it should so happen that the stars' orbit were perpendicular to the line of sight.

It would be scarcely possible, without the appearance of great exaggeration, to attempt to sketch out even in broad outline the many glorious achievements which doubtless lie before this method of research in the future.

Science News Letter, April 15, 1933

PUBLIC HEALTH

Electric Refrigerators Credited With Reducing Smallpox

THE LOWEST number of smallpox cases ever reported to the U. S. Public Health Service for the country as a whole has been recorded for the year 1932. The current year is on the way to breaking this record.

During 1932, 11,168 cases were reported. As recently as 1930, there were 48,907 cases.

Electric refrigerators may have been a factor in lowering the number of smallpox cases during recent years, public health officials suggested. Smallpox vaccine for preventive vaccinations keeps best at low temperatures. All vaccine packages are labelled with a warning to keep the vaccine on ice, and the U. S. Pharmacopoeia requires that they should be kept below freezing. With the old-style, ordinary icebox it was sometimes difficult for druggists to keep the vaccine cold enough to prevent its deterioration.

Public health officials believe that the refrigerated vaccination "takes" more often, and consequently more people are protected.

Other officials state that while refrigerated vaccine may play a part, it may be that the reduction in cases is due to chance or to unknown causes. They point to unexplained fluctuations in influenza and infantile paralysis.

Science News Letter, April 15, 1933

ENGINEERING

New Style Mattress On Mississippi River Bed

A BRAND NEW mattress with dust in it. A huge black flexible mattress 300 feet long, made and slid neatly into New Orleans harbor. This is the latest experiment of U. S. Army engineers, in their effort to find a really satisfactory mat to keep the Mississippi River's bed in order.

Since 1878, mats of one sort or another have been contrived and laid down in the river at the New Orleans wharves. The problem was, and is, to keep the river from eroding the banks and levees until they cave in.

For a year, Col. J. N. Hodges, district engineer of the U. S. Army Engineer Corps, has been directing work on this new type of mattress which would solve New Orleans' old problem. Walter C. Carey, a civilian engineer, took charge of the task.

After trying many ingredients, the engineers pronounced themselves satisfied with a mixture of about 12 per cent. paving asphalt, 66 per cent. river sand, and 22 per cent. loess—earth so fine that it is light dust. The mixture was poured over a great sheet of chicken wire, completely covering the wire, and producing a mattress that is flexible, does not crack, stands up under heavy water pressure, has no corroding metal exposed. Previous river mats have worn badly for lack of one or more of these qualities.

The new mattress was completed and lowered safely into place during the late-winter rise of the Mississippi, when the strain on the fabric would be greatest. The big black mat withstood the initial hard test and is apparently going to be as satisfactory in real wear as it promised in the laboratory tests.

Science News Letter, April 15, 1933

METEOROLOGY-ARCHAEOLOGY

Incas Anticipated Moderns In Frost-Fighting Method

THE modern method of protecting orange and lemon groves from frost damage by orchard firing on cold nights is not so new after all, archaeologists point out.

California groves are protected by thousands of pots burning a heavy crude oil. Long ago, in Cuzco, Peru, where

the climate was very cold because of the high altitude, Indian farmers used a similar device on frosty nights. Record of this Indian invention is found in the writings of Garcilaso de la Vega, who lived in Peru in the days of Spanish Conquest and claimed to be a descendant of the Incan Indians.

Garcilaso writes that on clear nights the valleys near Cuzco froze at any time of year. So, on a clear evening the Indians, fearing frost, would set fire to their rubbish heaps. Each individual tried to make a smoke in his corral, for it was said that frost was prevented by the smoke because it served as a blanket, like the clouds.

It has recently been learned that not the smoke, but the warmed air itself, is the frost preventive; but until this discovery was made, modern orchardists shared with ancient Indians a belief in the frost-stopping efficacy of smoke.

Science News Letter, April 15, 1933

CHEMISTRY

Eternal Youth for Bread Promised in Experiments

ETERNAL YOUTH for bread, biscuits, cakes and pies is promised by a Russian scientist, Dr. A. P. Mironov.

He discovered that under certain conditions the addition of a minute amount of agar-agar, a vegetable jelly, to the dough, prevents bread from becoming stale. In a test, bread loaves after six months storage were found to be almost indistinguishable from bread fresh from the oven.

Why does bread become stale? Any baker with scientific leanings can recite at a moment's notice a barrelful of startling theories on this commercially important subject. The truth of the matter, however, is that very little is really known about it, except that fresh bread rather quickly undergoes a change which makes it crumbly and hard, and causes the loss of its characteristic pleasant smell and taste. Contrary to the widely accepted idea, bread that grows stale is not drying out—it merely grows old and thus becomes not suitable for eating. This bakery profit erasing change is generally believed to be of a colloidal nature.

It is an established fact that a tiny amount of some colloid added to another colloid frequently causes a change in its properties. This was the starting point of Dr. Mironov's research, and after numerous failures he succeeded in

LINGUAPHONE IS THE KEY TO A NEW WORLD

LET Linguaphone help you unlock the doors of language, to gain entrance to a new world of science, thought, literature, art and intelligent travel. Linguaphone helps you master a new language easily, quickly and correctly in three month's time in the privacy of your own home.

Linguaphone is the scientific method of language study devised by some one hundred and fifty of the foremost language teachers of the Universities of Oxford, Cambridge, Columbia, The Sorbonne, Heidelberg, Bonn, Madrid and Milan. The Linguaphone Method is in no sense a popular "short cut," but is so simplified that any person of average education may learn to speak, understand, read and write a new language with practically no effort in about three months.

Learn By Listening

You learn by listening. For fifteen or twenty minutes a day you listen to the voices of the world's ablest language masters, electrically recorded by Linguaphone. As you listen to the records, you see the words and pictures in the illustrated text book. You listen again and again until quite naturally you find it easy to reproduce what you hear and see. Your pronunciation is perfect, your accent is like a native's, because the voices on the Linguaphone are especially selected for clarity of diction and purity of accent.

In this way you can master French, German, Spanish, Italian, Russian or any of the fifteen languages in the Linguaphone list.

Educators throughout the world have found the Linguaphone Method so simple, practical and pedagogically correct that they have endorsed it without reserve. More than 11,500 universities, colleges, high schools, commercial institutes and government training schools are TODAY using the Linguaphone.

At Your Leisure---at Home

For individual *home study* there is no equal to Linguaphone. Over one million men, women and children, of every degree of education, in all walks of life, ages from 6 to 60, have mastered a language the Linguaphone way. Scientists eager to keep abreast of the current literature in their field are studying German, French, Russian and Italian by the Linguaphone Method. Some study alone, others form small groups—either way it is more of a diversion than work.

Linguaphone in use at

Oxford University
Cambridge University
Trinity College
Harrow College
Harvard University
Columbia University
Smithsonian Institute
University of Chicago
Hunter College
Bryn Mawr College
New York University
U. S. Naval Academy
University of Denver
University of Seattle
University of Oregon
University of Mississippi
Tulane University
Bowdoin College
Catholic University
Union Theological Seminary and over 11,000 other institutions of learning

Endorsed by Users:

H. G. Wells, Bernard Shaw, Sinclair Lewis, Compton Mackenzie, Paul Robeson, Mrs. Albert Einstein and thousands of others.

Linguaphone Courses:

FRENCH	GERMAN	SPANISH
ITALIAN	RUSSIAN	POLISH
SWEDISH	DUTCH	IRISH
AFRIKAANS	ENGLISH	CHINESE
LATIN	GREEK	PERSIAN
JAPANESE	ESPERANTO	BENGALI

The complete story of Linguaphone makes fascinating reading. Our FREE Book S. N. and our "Pay as You Learn Plan" will be sent you on request.

LINGUAPHONE INSTITUTE
10 East 43rd Street New York City

If in Washington call for demonstration at our Washington office: 1012 15th Street, N. W.

LINGUAPHONE INSTITUTE
10 EAST 43RD STREET, NEW YORK.

Without cost or obligation please send me your Free Book S. N. and your "Pay as You Learn Plan."

Name.....

I wish to speak

Address.....

..... City.....

working out a set of bread-making conditions which gave the bread necessary qualities. Agar-agar is tasteless and odorless and being used in a very small quantity does not affect the taste, flavor and consistency of bakery products. In fact, this material made from a species of sea-weed has had already a long and honorable application in the confectionary industry, where it is extensively used in pastil, marmelade and jam making.

Agar-agar was one of the substances added experimentally to bread dough during research conducted in the food research laboratory of the Bureau of Chemistry and Soils of the U. S. Department of Agriculture by L. H. Bailey. Under the conditions of his experiments, however, Mr. Bailey did not obtain such results as are claimed in the Leningrad experiments of Dr. Mironov.

Science News Letter, April 15, 1933

CHEMISTRY

Lokombitsika Suggested As Cheaper Rival to Shellac

LOKOMBITSIKA, the shellac-like natural wax deposited on Madagascar forest trees by a species of insect, is suggested as a new raw material for American industry by L. Wilson Greene, writing in *Plastic Products*.

Although commercial quantities have been imported into France and Germany for several years, it is not yet used in this country. Mr. Greene tested a sample and found that although lokombitsika is inferior to shellac, also an insect secretion, for some purposes, it may prove useful as a cheap varnish material.

Science News Letter, April 15, 1933

PHYSIOLOGY

Carbon Dioxide Called Normal Stimulant of Breathing Center

CARBON DIOXIDE in low concentrations stimulates the nerve center in the brain which controls breathing. That is why a mixture of small amounts (5 per cent.) of carbon dioxide and oxygen has proved helpful and often life-saving in drowning, carbon monoxide poisoning and other cases of asphyxia. Evidence for the stimulating function of carbon dioxide gas was reported by Prof. Yandell Henderson and associates, E. M. Radloff and L. A. Greenberg, of Yale University for the American Physiological Society.

"Asphyxia always arises primarily from a deficient supply of oxygen to the tissues of the body," Prof. Henderson explained.

Formerly it was believed that there was at the same time an excess of carbon dioxide, the gas which is formed in the tissues and exhaled in normal breathing. Investigations have now shown that on the contrary there is a lack of carbon dioxide as well as of oxygen, since in the absence of oxygen no carbon dioxide is formed in the tissues.

Both gases are needed to resuscitate victims of any sort of asphyxia, but the two gases work in quite different ways, Prof. Henderson found. Lack of oxygen depresses and finally paralyzes the breathing-control center in the brain. But since oxygen is a food and not a stimulant, supplying oxygen, even in excessive amounts, never stimulates this center to start the breathing process of the body.

When the amount of carbon dioxide in the body is reduced, even a normal breathing center becomes inactive and breathing stops. Supplying carbon dioxide stimulates the center to start the body's breathing process again. Then the vital oxygen, which is also being supplied from the rescue squad's gas tank, can be inhaled and used.

Asphyxia occurs in drowning, in new born babies that fail to breathe spontaneously, and in the victims of carbon monoxide poisoning by city gas or by automobile exhaust gas. Asphyxia is also largely responsible for the depression of vitality after major surgical operations and prolonged anesthesia.

Effect of Illuminating Gas

What would be the effects on the body of small amounts of illuminating gas, such as might leak from faulty burners in concentrations too small to produce death?

An answer to this question was reported from the physiology laboratory of Iowa State College to the American Physiological Society. Erma Smith, associate professor, and coworkers, E. McMillin and I. Williams, exposed white rats for one hour daily to a gas-air mixture containing three-tenths of a per cent. of carbon monoxide, the deadly constituent of illuminating gas. After 150 consecutive days' exposure, they found the animals became unkempt in appearance, underweight and failed to rear their young.

All of the rats' organs contained an excessive amount of blood. The blood itself had an increased amount of hemoglobin and increased number of red cells.

Females were able to survive deadly concentrations of the gas for a longer time than males. Desexed animals did not show this difference. New born animals survived for three hours in mixtures which proved fatal in thirty minutes to 40-day-old rats. Adapted animals developed greatly increased tolerance.

Science News Letter, April 15, 1933

CONVENIENCE COUPON

for New or Renewal Subscription to Science News Letter

Send this coupon to Washington while you are thinking of it.

Science News Letter,
21st and Constitution Avenue,
Washington, D. C.

Please { start / renew } my subscription to SCIENCE NEWS LETTER. I am enclosing remittance as checked: ☐ 2 years, $7 ☐ 1 year, $5

Name .....

Street Address .....

City and State .....

If this subscription is a renewal, check here . . . .

ECOLOGY

NATURE RAMBLINGS
by Frank Thone

Solar Flight Dispatching

ROBINS are optimistically shouting their heads off, out in the orchard. Redwinged blackbirds came a while ago, and bluebirds and orioles will soon be here, with all the rest of the feathered choir. A fever of nest-building will be over the land, and a clamor of singing will make the early air tremble.

Bird migrations, bird songs, bird nest-building, are all governed by the same monarch of the skies that rules the coming of the spring flowers and the leafing-out of the trees: the sun. Through the increase in vegetation, and the consequent possible increase in numbers of insects, the sun supplies food for the birds and their insatiably hungry young ones. Through the same growth of leaves, better concealment of their nests is afforded. Even most of the hardy fowl that remain in our woods the year round, in cheerful defiance of winter, usually wait for spring before they undertake the serious business of mating and rearing families.

But the action of the sun upon the birds is much more direct than the furnishing of food and safety. Birds react directly to the increasing length of day in spring. Many experiments during recent years, with birds in cages given artificially controlled periods of light and darkness, indicate that the desire to migrate, the tendency to sing, and the urge toward mating, can be brought on at will by giving the birds increasingly long "days" even before the natural beginning of spring outdoors.

Prof. F. D. Rowan of the University of Alberta has found what appears to be a direct connection between mating and the migrating impulses in birds. He captured a number of young juncoes, hardy little winter birds that do not mind the snow. To some of them he gave artificially lengthened "days," leaving the others with the naturally short winter days of Canada. When released, the "short-day" birds continued to hang about the laboratory, showing no desire to migrate. The "long-day" birds went away, presumably stimulated into precocious migration. And when comparative laboratory studies were made on sample birds from the two classes, it was found that the sex glands of the "long-day" birds were enlarged and active, while those of the "short-day" birds were still in the smaller, quiescent winter condition.

Science News Letter, April 15, 1933

GEOLOGY

Polar Regions May Warm In Recovery From Last Ice Age

EVEN THOSE portions of the earth not covered by ice during glacial periods are indirectly influenced by the ice sheet. One of the rare instances where these influences could be detected was described by Prof. Wm. Morris Davis, visiting professor of geology from Harvard University in an address in Pasadena, Calif.

The unusual locality was the Santa Monica mountains which rise out of the ocean immediately west of Los Angeles. There the effects of three successive glacial periods are visible. During these the sea receded and the steep cliffs which it wore from the mountains were left to be softened and filled in by land deposits. Meanwhile the land was rising, so that after the glacier withdrew the sea could not reach its old shore-line and consequently made new sharp cliffs at a lower level. This process was repeated twice.

It is estimated that during a glacial period the sea level may sink thirty feet or more. Since the water removed from the sea forms ice on the continents and since these cover only about one-fifth of the earth's surface, the ice layer must attain an average thickness of several hundred feet, even if it is spread over half the earth. The present sheet over Greenland is thousands of feet thick.

It is well known about how fast the land is rising in California; so from the difference in level between successive cliffs estimates can be made of the elapsed time between glaciers and since the last one. It turns out that the last one was quite recent in comparison with the interval between glacial periods. Prof. Davis suggested that this may indicate that the earth will get warmer before it starts to cool again prior to the next glacier. The ice caps in the polar regions may disappear entirely and the poles may become useful and inhabited places.

Even though the average temperature of the earth need drop only about five degrees below the present average to bring on a glacial period, the consequent change in climate may be enormous. If the earth warms up enough to melt all glaciers now existing a remarkable change in climate all over the world would probably result. The advantage to science would be incalculable if we could take observations and make explorations in comfort in the polar regions.

Science News Letter, April 15, 1933

PHYSIOLOGY

Blood Gives No Clue To Tooth Decay in Pregnancy

THE AMOUNT of bone- and tooth-building calcium and phosphorus in the blood has no direct relation to the condition of the expectant mother's teeth during pregnancy, Drs. J. W. Mull and F. M. Kinney of the Maternity Hospital and School of Dentistry, Western Reserve University, have found. They were seeking an explanation of the toooth decay often associated with pregnancy, which gave rise to the old saying, "A tooth for every child."

The amount of calcium in the blood varies with the seasons, being lowest during the months January to May, the Cleveland investigators reported at the meeting at Cincinnati of the Federation of American Societies for Experimental Biology. The calcium content of the blood is also influenced by pregnancy. But the vast majority, 49 of 54 cases, showing dental decay during pregnancy had normal blood calcium.

Phosphorus, another important bone- and tooth-builder, showed no seasonal variations and very little change during pregnancy.

Science News Letter, April 15, 1933

The next issue of SCIENCE NEWS LETTER (for April 22) will be the SPRING BOOK NUMBER

c o n t a i n i n g

1. **Long lists of new science books**
2. **Reviews of scores of books**
3. **Pertinent quotations from important new books**
4. **Advertising announcements of publishers**
5. **Current news of science**

Tell Your Friends about SCIENCE NEWS LETTER

First Glances at New Books

Economics

THE AMERICAN TRANSPORTATION PROBLEM—Harold G. Moulton and Associates—*Brookings Institution,* LXIX, 915 p., $3. With remarkable speed Dr. Moulton and his associates have produced a volume of permanent importance on the American transportation situation. The report of the National Transportation Committee is, of course, included.

Science News Letter, April 15, 1933

Archaeology

THE ANCIENT SYNAGOGUE OF BETH ALPHA—Eleazar L. Sukenik—*Oxford University Press,* 58 p., 27 pl., $10. Much interest was aroused when the Hebrew University excavated this Jewish synagogue in Palestine and described its remarkable mosaic pavement featuring Bible pictures. Prof. Sukenik's report now shows these examples of Jewish art in fine plates, some in color, and in numerous smaller illustrations. The synagogue was standing in the sixth century A. D., and was destroyed by earthquake. Architectural features preserved in the ruins present some new thoughts on synagogue construction, and are described in detail in the report.

Science News Letter, April 15, 1933

Geology

KYANITE IN VIRGINIA, Bulletin No. 38—Geology of the Kyanite Belt, by Anna I. Jonas, and Economic Aspects of Kyanite, by Joel H. Watkins—*Virginia Geological Survey,* 52 p., Free in Virginia; postage elsewhere, 4c.

Science News Letter, April 15, 1933

Mathematics

INTERMEDIATE ALGEBRA—Joseph B. Orleans and Walter W. Hart—*D. C. Heath,* 294 p., $1.32. A textbook for a second course in algebra.

Science News Letter, April 15, 1933

Engineering—Economics

THE ECONOMICS OF TECHNOCRACY—Aaron Director—*University of Chicago Press,* 27 p., 25c. This number 2 of the "Public Policy Pamphlets" is a post-mortem on technocracy and a contribution to the economics of the present crisis.

Science News Letter, April 15, 1933

Medical Economics

THE ABILITY TO PAY FOR MEDICAL CARE—Louis S. Reed—*University of Chicago Press,* 107 p., $2. Publication of the Committee on Costs of Medical Care. Interesting facts and figures on the incomes of American families and how they are spent.

Science News Letter, April 15, 1933

Medical Economics

THE INCIDENCE OF ILLNESS AND THE RECEIPT AND COSTS OF MEDICAL CARE AMONG REPRESENTATIVE FAMILIES—I. S. Falk, Margaret C. Klem, Nathan Sinai—*University of Chicago Press,* 327 p., $3. Publication of the Committee on the Costs of Medical Care.

Science News Letter, April 15, 1933

Ethnology

THE TANALA, A HILL TRIBE OF MADAGASCAR — Ralph Linton—*Field Museum,* 334 p., $2.25. The first comprehensive report on a tribe that has kept alive a simple culture, apparently archaic. The tribe is one of those closely studied by the Marshall Field Anthropological Expedition to Madagascar, which sought especially for clues to the early Malayan culture. Madagascar was the westernmost point reached by Malayan peoples.

Science News Letter, April 15, 1933

Zoology-Botany

ZOOLOGICAL PARKS, AQUARIUMS AND BOTANICAL GARDENS—L. C. Everard—*Am. Ass. of Museums,* 72 p., $1. This list, comprising most of the zoological parks, aquariums and botanical gardens of the United States, fills a long-felt want. Compact information is given on such things as sponsorship, age, and size of each establishment, with number of species on display and number of visitors attending.

Science News Letter, April 15, 1933

Geology-Engineering

STABILIZATION OF THE PETROLEUM INDUSTRY—Leonard M. Logan, Jr.—*University of Oklahoma Press,* 248 p., $2.50. Of current interest because of the crisis in the oil industry.

Science News Letter, April 15, 1933

Science News Letter will secure for its subscribers any book or magazine in print which was published in the United States. Send check or money order to cover regular retail price ($5 if price is unknown, change to be remitted) and we will pay postage in the U. S. When publications are free, send 10c for handling. Address: Book Dept., Science News Letter, 21st and Constitution Ave., Washington, D. C.